1.   A method for establishing a point to point connection in a network, comprising:

identifying an address for an egress node in the network;

identifying a next hop in the network for the address;

associating a label value with the address; and

receiving data that includes the label value and then transferring the data to the next hop for the address.

2.   A method according to claim 1 including:

receiving the egress node address during a layer 3 flooding stage;

identifying the next hop by using a layer 3 protocol that identifies the shortest path to the egress node; and

receiving the data and transferring the data to the identified next hop during a layer 2 point to point connection.

3.   A method according to claim 1 including transferring the data independently of any payload type for the data.

4.   A method according to claim 3 wherein the payload type for the data comprises IP packets having IP destination addresses and forwarding the data to the next hop without using the IP destination addresses.

5.   A method according to claim 1 including receiving the address and the label via a flooding protocol.

6.   A method according to claim 5 wherein the flooding protocol is an Interior Gateway Routing Protocol based on an Shortest Path First scheme.

7.   A method according to claim 5 wherein the flooding protocol is an IP flooding protocol.

8.   A method according to claim 5 including using a Shortest Path First (SPF) protocol after the flooding protocol to identify the next hop for the address.

9.   A method according to claim 1 including maintaining a table that associates different label values with different egress node addresses.

10.   A method according to claim 1 including receiving the egress node address and the label value via a Link-State Advertisement (LSA) packet.

11.   A method according to claim 10 including providing multiple label values in the LSA packet for the same egress node address.

12.   A method according to claim 1 including receiving a Quality of Service (QoS) value along with the label value.

13.   A method according to claim 1 wherein the address is an IP address, the data is an Ethernet frame and the label value is a VLAN Id value.

14.   A method according to claim 1 wherein the address is an IP address, the data is an Ethernet frame and the label value is a MPLS label.

15.   A method according to claim 1 including maintaining a table that associates different label values with different egress node addresses.

16.   An network processing node, comprising:

an input port receiving an Ethernet frame containing a label value;

a table that contains label values indexing next hops in a network;

a processor identifying one of the next hops for forwarding the Ethernet frame by matching the label value in the Ethernet frame with one of the label values in the table; and

an output port outputting the Ethernet frame to the identified next hop.

17.   A network processing node according to claim 16 wherein the processor transfers the Ethernet frame using a layer 2 point-to-point connection protocol and determines the next hop using a layer 3 IP shortest path first protocol.

18.   A network processing node according to claim 16 wherein the label values in the table comprise VLAN Id values.

19.   A network processing node according to claim 16 wherein the processor receives addresses associated with egress nodes in the network and receives label values associated with the egress node addresses, the processor identifying the next hops in the network for sending data to the egress node addresses and then using the label values associated with the egress node addresses for indexing the next hops.

20.   A network processing node according to claim 16 wherein the processor is located in an ingress node that attaches the label values to incoming the Ethernet frames

5   according to an ingress node interface and then forwards the Ethernet frames to the next hops

in the network associated with the attached label values.

21.   A network processing node according to claim 16 wherein the egress node

addresses and associated label values are received in Link-State Advertisement (LSA)

10   packets.

22.   A network processing node according to claim 16 wherein the processor

receives the egress node addresses and identifies the next hops for the egress node addresses

during an IP flooding and routing path identification session.

23.   A network processing node according to claim 22 wherein the processor

identifies the next hops using a Shortest Path First protocol.

24.   A metropolitan area network, comprising:

an egress node having a layer 3 address;

intermediate nodes that use the layer 3 address to identify next hops for transferring

an Ethernet frame to the egress node; and

an ingress node that establishes a layer 2 logical point-to-point connection through the

intermediate nodes to the egress node by assigning a label to the Ethernet frames that the

25   intermediate nodes associate with the identified next hops along the point-to-point

connection.

25.   A metropolitan area network according to claim 24 including tables in the

intermediate nodes that index the next hops using the label assigned to the Ethernet frame.

26   A metropolitan area network according to claim 24 wherein the ingress node is part of an Internet Service Provider network.

27.   A metropolitan area network according to claim 24 wherein the label is a VLAN Id.

28.   A metropolitan area network according to claim 24 wherein the label is a MPLS label.

29.   A metropolitan area network according to claim 24 wherein the egress node uses a layer 3 flooding protocol to transmit the layer 3 address to the intermediate nodes and the intermediate nodes then use a layer 3 route identification protocol to determine the next hops.

30.   A metropolitan area network according to claim 24 wherein the egress node sends a Link-State Advertisement (LSA) packet to the intermediate nodes that contain the egress node address and the label associated with the egress node address.

31.   The network according to claim 24 wherein the label includes a Quality of Service value.

32.   A metropolitan area network according to claim 24 including:

multiple ingress nodes that are configured to assign a same label value to the Ethernet frames received over ingress connections; and

5   intermediate nodes that establish different point to point connections from the

multiple ingress nodes to the egress node by identifying the next hops for the Ethernet frames

according to the same label value.

     33.   A metropolitan area network according to claim 32 wherein the intermediate

10   nodes forward the Ethernet frames according to the label value independently of ingress input

ports on the intermediate nodes receiving the Ethernet frames.

Patent Application
Atty. Doc. No. 3981-11